

Autism children dietary habits in Hail, Saudi Arabia: A parents' survey

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ABSTRACT

Background: Developmental disabilities like autism are brought on by variations in the brain. Confined or repetitive habits or interests, as well as social engagement and communication, are common struggles for people with autism. The purpose of this study was to evaluate the dietary habits of autistic children in Hail, Saudi Arabia: A parents' survey. **Methodology:** This is a cross sectional descriptive observational study conducted at Tawasol Medical Centre for Autism in Hail, Saudi Arabia. About 80 autistic children and their parents were enrolled in the study to analyze the children's food habits based on parental confession. During the months of March and April 2022, data were collected from two Tawasol Medical Centres for Autism and one Hdka Medical Centre for Autism. **Results:** There were 67.5% boys and 32.5% girls among the 80 children, for a male: Female ratio of 2.07:1.00. Constipation and Bulges is the most common Child digestive ailment, followed by both (Constipation, Bulges) and (Diarrhea, Diarrhea and Bulges), accounting for 29%, 24%, and 11%, respectively. Most children "cry or scream at mealtimes" on occasion (38%), followed by frequently (28%). The probability of female children constantly "crying or screaming at mealtimes" is 2.4231 (0.9049 to 6.4884), $P = 0.0782$. **Conclusion:** Autism is frequent in Saudi Arabia, with a male to female ratio that is lower than worldwide recorded ratios. Various gastrointestinal issues exist among Saudi autistic children, necessitating specific instructions. Many autistic children have unfavorable behavioral and dietary habits, necessitating community level interventions.

Keywords: Autism, Saudi Arabia, dietary habits, nutrient, children

1. INTRODUCTION

Autism which is mutually termed as an autism spectrum disorder (ASD) is a heterogenous, multi factorial, developmental disability disorder. ASD is characterized by a persistent decline in communal social communication, social interaction and restricted, repetitive patterns of behavior, interests, or activities (Joon et al., 2021). The global prevalence of autism was 100/10,000 (range 1.09/10,000 to 436.0/10,000). The median shared happening intellectual disability was 33%. Prevalence rates varied, potentially indicating complex and vigorous links between patterns of community knowledge, local service capacity, support seeking and socio demographic factors (Zeidan et al., 2022).

In recent years there is special attention and an increase in autism genetic research, which revealed a huge number of discoveries (Thapar and Rutter, 2021).

In recent years, there is growing attention on the prospective influence of the gut microbiome on ASD. It was reported that ASD associated limited interests are related to the less disparate diet, decreased microbial taxonomic diversity and looser stool consistency. Therefore, mycobiome differences in ASD may reflect varying dietary preferences (Yap et al., 2021). Feeding obstacles are commonly encountered in children with autism and their families. Certain troubles are linked to food discernment and food refusal and are more likely focused than those related to mealtime (Bonsall et al., 2021; Kang et al., 2022). Recent studies from Saudi Arabia have shown relatively low awareness levels of autism (Sabbagh et al., 2021; Abualhommos et al., 2022; Alyami et al., 2022). As a result, the purpose of this study was to evaluate the dietary habits of autistic children in Hail, Saudi Arabia: A parents' survey.

2. MATERIALS AND METHODS

This is an observational cross sectional descriptive study conducted in in two medical centers in Hail, Saudi Arabia. About 80 autistic child and their parents were included to assess the dietary habits of the children through parents' confession. Data were collected from two Tawasol Medical Centres for Autism and Hdka Medical Centre for Autism during the period from March to April 2022. These centers provide essential mediation to children with ASD and Charitable Society for the Care of the Handicapped.

Inclusion Criteria

The two sexual orientations every Saudi child with an autism spectrum disorder diagnosis has consented to take part in the examination. All the children visited Tawasol Medical Center and Hdka. Living in Hail city, Saudi Arabia aged 4 to 12 years children who have had an autism diagnosis for at least 6 months.

Exclusion criteria

Determination of Aspersers' syndrome, Rett disorder or another inherent ailment, such as inborn coronary disease, chronic seizures or a severe or continual full body ache in the previous 90 days. Any food or drug allergies. Use of any nourishing enhancements in the last six months. Use of any prescription to address conduct/center/consideration in the previous six months. Mature not less than four years.

Ethical consent

All parents have consented before inclusion in the study.

Data collection

A purposeful questionnaire was used in the collection of information. Besides child identification data, the questionnaire included inquiries such as Predictors of digestive issues, child behaviors during meals, child manners during meals, response to food type by acceptance and response to food type by refusal.

Statistical Analysis

Data management was done by using Statistical Package for Social Sciences (SPSS version 21.0). Age was presented in ranges, mean and median. A similar presentation for the sum of males and females was presented in frequencies and percentages. Nutritional knowledge was presented in frequencies and percentages. Relative Risk and Chi square tests were performed, P value less than 0.05 were considered statistically significant.

3. RESULTS

This study included 80 children aged 4 to 12 years with a mean age of 8.5 years. Of 80 children 54/80 (67.5%) were males and 26/80 (32.5%) were females with a Male: Female ratio of 2.07:1.00. Most participants were aged 10 years, followed by 7 years and 9 years, representing 16/80(20%), 11/80(13.8%) and 10/80(12.5%), respectively. Males were clustering in ages 10 years and 11 years constituting 10/54 (18.5%), hence females were aggregating in ages 5 years, 6 years and 10 years, corresponding to 6/26 (23%) for each, as indicated in Table 1, Figure 1.

Table 1 Distribution of the study subjects by age and gender

Age in years	Males	Females	Total
4	2	1	3
5	2	6	8
6	3	6	9
7	9	2	11
8	3	2	5
9	10	0	10
10	10	6	16
11	7	2	9
12	8	1	9
Total	54	26	80

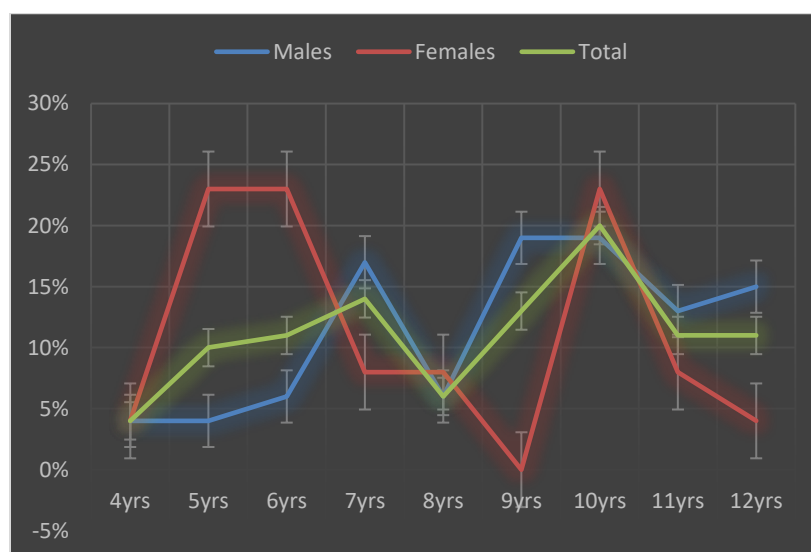

Figure 1 Age and gender description of study subjects

Table 2, Figure 2, summarizes the distribution of autistic children by gender and predictors of digestive issues. The most frequent Child digestive problem is Constipation and Bulges followed by both (Constipation, Bulges) and (Diarrhea, Diarrhea and Bulges), representing 23/80(29%), 19/80(24%) and 9/80(11%), respectively. The relative risk (RR) and the 95% confidence interval (95% CI) and P value were calculated. The risk of diarrhea in female children, the RR (95%CI) = 1.3352 (0.6667 to 2.6740), P = 0.4146.

Most children "Cry or scream at mealtimes" occasionally 30/80(38%) followed by often 22/80(28%). About 31/80(39%) "Turns his/her face or body away from food" and 24/80(30%) often around 34/80(23%) child "Expels food that he/she has eaten" occasionally and 18/80(23%) never. The risk of always "Crying or screaming at mealtimes" in female children, the RR (95%CI) =2.4231 (0.9049 to 6.4884), P = 0.0782.

Table 2 Distribution of the autism children by gender and predictors of digestive issues

Variable	Males (n=54)	Females (n=26)	Total (n=80)
Child digestive problems			
Constipation	14	5	19
Diarrhea	4	5	9
Bulges	15	4	19
Constipation and Bulges	14	9	23

Diarrhea and Bulges	6	3	9
Constipation, Diarrhea, and Bulges	1	0	1
Cries or screams at mealtimes			
Never	4	1	5
Seldom	7	3	10
Occasionally	19	11	30
Often	18	4	22
Always	6	7	13
Turns his/her face or body away from food			
Never	4	1	5
Seldom	9	5	14
Occasionally	21	10	31
Often	16	8	24
Always	4	2	6
Expels food that he/she has eaten			
Never	13	5	18
Seldom	13	3	16
Occasionally	21	13	34
Often	4	3	7
Always	3	2	5

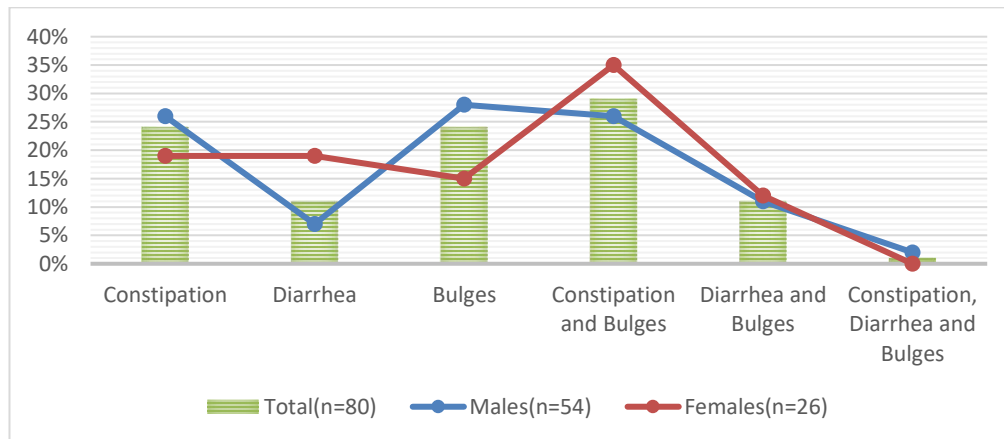


Figure 2 Child digestive problems within an entire gender group

As summarized in Table 3, about 25(31%) children seldomly "Remains seated at the table until the meal is finished" followed by 23(29%) occasionally. Around 29(36%) child seldomly "Aggressive during mealtimes" followed by 27(34%) occasionally. Over 30(38%) of children occasionally "Displays self injurious behavior during mealtimes" followed by 22(28%) seldomly. Over 50(63%) of children occasionally "Close mouth tightly when food is presented" followed by 15(19%) seldomly.

Table 3 Distribution of the autistic children by gender and child behaviors during meals

Variable	Males (n=54)	Females (n=26)	Total (n=80)
Remains seated at the table until the meal is finished			
Never	6	6	12
Seldom	15	10	25
Occasionally	18	5	23
Often	13	5	18

Always	2	0	2
Aggressive during mealtimes			
Never	5	2	7
Seldom	20	9	29
Occasionally	18	9	27
Often	8	5	13
Always	3	1	4
Displays self injurious behavior during mealtimes			
Never	5	3	8
Seldom	15	7	22
Occasionally	21	9	30
Often	9	5	14
Always	4	2	6
Closes mouth tightly when food is presented			
Never	2	3	5
Seldom	12	3	15
Occasionally	34	16	50
Often	5	3	8
Always	1	1	2

Table 4 summarizes the distribution of autistic children by gender and child manners during meals. More than 28(35%) of children occasionally "are disruptive during mealtimes" followed by 20(25%) often. About 27(34%) children seldomly "are flexible about mealtime routines" followed by 22(28%) never. About 26(33%) of children were never "willing to try new foods" followed by 22(28%) occasionally.

Table 4 Distribution of the autistic children by gender and child manners during meals

Variable	Males (n=54)	Females (n=26)	Total (n=80)
Is disruptive during mealtimes			
Never	3	4	7
Seldom	14	5	19
Occasionally	20	8	28
Often	14	6	20
Always	3	3	6
Is flexible about mealtime routines			
Never	14	8	22
Seldom	20	7	27
Occasionally	14	6	20
Often	3	3	6
Always	3	2	5
Is willing to try new foods			
Never	15	11	26
Seldom	14	4	18
Occasionally	16	6	22
Often	6	3	9
Always	2	2	4

Table 5 recaps the distribution of autistic children by gender and response to food type by acceptance. Nearly 22(28%) children always “Prefer the same food at each meal” followed by 19(24%) occasionally. Approximately 28(35%) children occasionally “Prefer crunchy foods” followed by 20(25%) seldomly. Roughly 23(29%) children seldomly “Accept or prefers a variety of foods” followed by 22(28%) occasionally. Around 27(34%) children seldomly “Prefer to have food served in a particular way” followed by 22(28%) occasionally. The risk of often “Prefers to have food served in a particular way” in male children, the RR (95%CI) = 1.3757 (0.6679 to 2.8332), P = 0.3869. The risk of always “Prefers to have food served in a particular way” in male children, the RR (95%CI) = 0.9028 (0.4397 to 1.8534), P = 0.7805.

Around 27(34%) children occasionally “Prefer food prepared in a certain way (fried and greasy)” followed by 24(30%) always. The risk of often “Prefers food prepared in a certain way (fried and greasy)” in male children, the RR (95%CI) = 4.3333 (1.0859 to 17.2928), P = 0.0378. About 34(43%) children occasionally “Prefer only sweet foods” followed by 25(31%) always. The risk of always “Prefers only sweet foods” in female children, the RR (95%CI) = 1.3846 (0.7235 to 2.6500), P = 0.3258.

Table 5 Distribution of the autistic children by gender and response to food type by acceptance

Variable	Males (n=54)	Females (n=26)	Total (n=80)
Prefers the same food for each meal			
Never	6	1	7
Seldom	12	5	17
Occasionally	12	7	19
Often	11	4	15
Always	13	9	22
Prefers crunchy foods			
Never	6	7	13
Seldom	12	8	20
Occasionally	25	3	28
Often	8	5	13
Always	3	3	6
Accepts or prefers a variety of foods			
Never	7	5	12
Seldom	14	9	23
Occasionally	19	3	22
Often	8	5	13
Always	6	4	10
Prefers to have food served in a particular way			
Never	1	1	2
Seldom	4	2	6
Occasionally	14	8	22
Often	20	7	27
Always	15	8	23
Prefers food prepared in a certain way (Fried and greasy)			
Never	1	2	3
Seldom	4	2	6
Occasionally	16	11	27
Often	18	2	20
Always	15	9	24
Prefers only sweet foods			
Never	0	1	1
Seldom	3	0	3

Occasionally	23	11	34
Often	13	4	17
Always	15	10	25

Table 6 summarizes distribution of the autistic children by gender and response to food type by refusal. About 28(35%) of children always "Dislike certain foods and will not eat them" followed by 19(24%) often. About 26(33%) children occasionally "Refuse to eat foods that require a lot of chewing" followed by 21(26%) seldom.

Table 6 Distribution of the autistic children by gender and response to food type by a refusal

Variable	Males (n=54)	Females (n=26)	Total (n=80)
Dislikes certain foods and will not eat them			
Never	6	1	7
Seldom	6	6	12
Occasionally	11	5	16
Often	14	3	17
Always	17	11	28
Refuses to eat foods that require a lot of chewing			
Never	7	1	8
Seldom	13	8	21
Occasionally	19	7	26
Often	4	3	7
Always	11	7	18

4. DISCUSSION

The findings of the present study showed that autism is common among boys and more apparent in the age range 8-10 years. Autism is more common among males with a Male: Female ratio of 4.00:1.00. Some studies have linked this increased ratio with a bias, that remains a mystery and is supposed to be an extreme manifestation of the male brain (Chakrabarti and Fombonne, 2001; Baron-Cohen et al., 2011) in a meta-analysis estimating the prevalence rates of ASD since the introduction of the DSM-IV, the true Male: Female ratio for children meeting the criteria for ASD is not 4.00:1.00, it is closer to 3.00:1.00. Here seems to be a diagnostic gender bias, suggesting that females who meet up criteria for ASD are at inconsistent risk of not getting a clinical diagnosis (Loomes et al., 2017).

The findings of the current study have shown that many autistic children have digestive problems, particularly, diarrhea and bulges. Gastrointestinal problems are prevalent among ASD patients. An emerging form of largely pre clinical research proposes that dysbiosis may modulate brain function resulting in gastrointestinal disorders. However, little is understood about the exact mechanisms that accentuate these associations and how they may influence the pathogenesis of ASD (Chernikova et al., 2021). A study found that children with ASD reveal extra eating and mealtime troubles and subordinate dietary quality and variety to their usually developing counterparts. This necessitates the need for routine monitoring and early recognition of mealtime behavior and nutrimental problems among autistic children (Yeung et al., 2021).

The findings of the present study revealed diverse child behaviors during meals with no significantly observed pattern. Shared family meals have significant effects on a child's health and welfare, yet mealtimes with autistic children are frequently marked by stress and bad behavior. The difficulties that families with autistic children encounter during mealtimes can be better understood, as can the solutions that families come up with to advance the health and safety of their families (Curtiss and Ebata, 2021).

In the current study, we observed varying degrees of autism child's response to food type by acceptance, as well as by refusal. The description of sensory involvement in eating behavior in autism raises the idea that changes in the way sensory cues associated to food are enjoyed occurring in autism and are linked to food phobia. To improve eating behavior through familiarization, interventions that target sensory processes are offered. However, sensory familiarization, along with other factors such as a social context, a progression from unimodal to multimodal stimuli, the child's support as an agent and finally paying attention to the child's rhythm, may alter food acceptance in autistic individuals (Genevieve Petitpierre et al., 2021).

5. CONCLUSION

Autism is common in Saudi Arabia and prevalent among males with a ratio lower than globally reported ratios. Diverse gastrointestinal problems exist among Saudi autistic children which necessitate specific guidelines. Unfavorable behavioral and eating habits have been identified in many autistic children, necessitating community level interventions.

Acknowledgment

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Informed consent

Written and Oral informed consent was obtained from the patient identified in this study.

Ethical Approval

This study has been reviewed and approved by the Research Ethics Committee (REC) at the University of Hail dated 07/03/2022. No of Research H-2022-054

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Conflict of interest

The authors declare that there is no conflict of interests.

Data and materials availability

All data sets collected during this study are available upon reasonable request from the corresponding author.

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